

# GONOCOCCAL OPHTHALMIA AMONG NEWBORN INFANTS AT LOS ANGELES COUNTY GENERAL HOSPITAL, 1957-63

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INCIDENCE of ophthalmia neonatorum has declined markedly since Crede, in 1881, first used silver nitrate in the eyes of infants at birth. A further decrease has resulted with the use of sulfonamides and antibiotics (1-3). In studies of children enrolled in schools for the blind, sightlessness caused by ophthalmia neonatorum decreased from 28.2 percent in 1906-07 to 0.1 percent in 1958-59 (4).

This study was undertaken to estimate current infection rates at one institution, to determine the incubation period, to record the response to treatment, and to evaluate the severity of gonococcal ophthalmia.

## Method and Results

From July 1, 1957, to June 30, 1963, 23 cases of gonococcal ophthalmia neonatorum occurred among 62,752 infants born alive at unit I, Los Angeles County General Hospital (table 1). This hospital is a public institution serving individuals who cannot afford private medical care. Eighty percent of the maternity patients admitted to the hospital are served in unit I.

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Before leaving the delivery room, each of the 23 infants discussed in this study was given prophylaxis for gonococcal ophthalmia. One percent silver nitrate was used during the first 5 years of the study. During the last year 1 percent tetracycline ophthalmic ointment was used. During December 1959 and January 1960, silver nitrate prophylaxis was repeated for infants admitted to the premature nursery. Two of the infants studied were born during this period.

Mucopurulent exudate from one or both eyes during the first 21 days of life, with smear or culture or both positive for *Neisseria gonorrhoeae*, was the criterion for clinical diagnosis. This condition was evident by the fourth day of life in 16 of the 23 infants (table 2). A pair of twins had different dates of onset: In the firstborn on the third day of life and in the secondborn at birth. Nineteen (82.5 percent) of the infants were premature, weighing 2,500 grams or less at birth.

Diagnosis of 14 cases of gonococcal ophthalmia was definitely established when identification of gonococci in cultures of exudate was confirmed by carbohydrate fermentation tests. Two cases were classified as probable gonococcal ophthalmia because results of oxidase tests were positive; carbohydrate fermentation tests either were not performed or their results were inconclusive. Seven cases were considered possible gonococcal ophthalmia because gonococci were detected in smears; carbohydrate fermentation and oxidase tests either were negative or were not performed.

In the 14 definitive cases, 5 cultures were positive for *N. gonorrhoeae* only; 9 cultures were

**Table 1. Live births and incidence of gonococcal ophthalmia neonatorum at unit I, Los Angeles County General Hospital, July 1, 1957–June 30, 1963**

Year <sup>1</sup>	Live births	Gonococcal ophthalmia neonatorum <sup>2</sup>	Rate per 100,000 live births
1957–58.....	10,654	1	9.4
1958–59.....	10,475	2	19.1
1959–60.....	9,979	7	70.1
1960–61.....	10,345	3	29.0
1961–62.....	10,523	4	38.0
1962–63.....	10,776	6	55.7
Total.....	62,752	23	36.9

<sup>1</sup> July 1 to June 30.

<sup>2</sup> Includes possible, presumptive, and definite cases.

positive for *N. gonorrhoeae* and 2 to 4 other bacteria. Six of the 14 definitive cases were proved positive by subsequent cultures after the first culture was negative. A total of 39 cultures was made of specimens from the 23 patients. *Staphylococcus albus* was the organism found most frequently in the cultures.

Initially a variety of treatments were used in these cases: In 14 antibiotic ointments were used; in 7 parenteral penicillin (procaine in 6 and crystalline in 1) was administered intramuscularly; and in 1 phenoxymethyl penicillin administered orally and polymyxin ophthalmic ointment were used. No treatment was given to one infant who died shortly after birth.

Twelve of the 14 infants given local treatment initially subsequently were given penicillin intramuscularly daily for 2 to 8 days. The average length of treatment was 4 days. The discharge stopped within 1 to 5 days after regular administration of penicillin. One infant was treated locally with antibiotic ophthalmic ointments for 6 weeks—during which time repeated cultures and smears for *N. gonorrhoeae* were negative—before a positive culture was obtained. His eyes cleared after penicillin was given intramuscularly for 4 days.

Two infants did not receive penicillin intramuscularly. Treatment with polymyxin B sulfate (10,000 units) and zinc bacitracin (500 units) ointment stopped exudation from one infant after 3 days. The other infant was given phenoxymethyl penicillin orally and poly-

myxin B sulfate ophthalmic ointment was applied to stop exudation. Penicillin administered intramuscularly is the drug of choice for treatment of gonococcal ophthalmia neonatorum.

## Discussion

Gonococcal ophthalmia neonatorum occurred at a rate of 37.7 per 100,000 live births in unit I of the Los Angeles County General Hospital between July 1, 1957, and June 30, 1963. The yearly rate ranged from 9.4 to 70.1 per 100,000. The significance of this range is difficult to assess because only 23 cases occurred among 62,752 infants.

During the study period 12.5 percent of the 62,752 births were premature while 82.5 percent of the 23 cases of ophthalmia neonatorum were in premature infants. Premature infants appeared to be particularly susceptible to ophthalmia neonatorum. This difference may be due in part to retention of premature infants in the hospital. The average stay of a premature baby is 23 days, while a full-term baby usually stays 2 days. However, in those cases with the onset within 48 hours of birth, 8 of 11 (73 percent) were in premature infants (table 2). Full-term infants may develop the initial symptoms following discharge from the nursery.

One percent silver nitrate drops or 1 percent tetracycline ophthalmic ointment were equally effective prophylaxis. Incidence of failure with these agents is similar to that reported for

**Table 2. Age at onset and prophylaxis used for infants with gonococcal ophthalmia neonatorum**

Age at onset (days)	1 percent silver nitrate		1 percent tetracycline		Total
	Full term	Pre-mature	Full term	Pre-mature	
Birth.....	1	2	1	0	4
1.....	1	0	0	0	1
2.....	0	5	0	2	7
3.....	0	3	0	0	3
4.....	0	1	0	0	1
5–9.....	1	1	0	2	4
10–21.....	0	2	0	1	3
Total.....	3	14	1	5	23

silver nitrate or for various antibiotic ointments (2, 5-7).

Exudation from the eyes of eight of the infants began between the 4th and 21st day after birth. The prolonged incubation period may have been due to the suppressant effect of prophylaxis or to long-acting antibiotics used to treat the mother late in pregnancy. However, in Mellin and Kent's series (1), two infants who had not received prophylaxis to the eyes developed symptoms on the sixth and eighth days of life.

It is generally accepted that infants contract this infection during passage through the birth canal. However, contact with organisms after rupture of the membranes before delivery is theoretically possible. There is strong presumptive evidence that mothers were the source of infection because the premature infants developed signs before their discharge from the nursery and there was no evidence of cross-infection.

Bacteriological determination of *N. gonorrhoeae* is difficult because the organism is fastidious and grows slowly. In some cases initial cultures were negative, but subsequent cultures were positive. Because the occurrence of other *Neisseria* is common, smears alone are not reliable.

The cases reviewed in this series were mild when compared with descriptions of this disease in earlier literature. None of the infants in this study developed blindness. If they are treated, the prognosis for such infants is good.

### Summary

Twenty-three cases of gonococcal ophthalmia neonatorum occurred among 62,752 infants born alive between July 1, 1957, and June 30, 1963, at unit I, Los Angeles County General Hospi-

tal. Before leaving the delivery room, each infant was given either 1 percent silver nitrate or 1 percent tetracycline ophthalmic ointment prophylaxis. There was no significant increase in infections during the period tetracycline ointment was used as a prophylactic agent.

In six cases two or more cultures were necessary to establish a definitive bacteriological diagnosis.

Nineteen of the infected infants were premature. The apparent susceptibility of premature babies to ophthalmia neonatorum may be skewed because they are kept at the hospital from 7 to 110 days; full-term babies usually leave the hospital within 2 days. Symptoms not evident in the nursery may develop at home.

Penicillin, administered parenterally, is the drug of choice in the treatment of gonococcal ophthalmia neonatorum.

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